

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)



(PCT Article 36 and Rule 70)

Applicant's or agent's file reference D51704WO/hi/re	FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/US2004/031258	International filing date (day/month/year) 22.09.2004	Priority date (day/month/year) 21.10.2003	
International Patent Classification (IPC) or national classification and IPC H01R12/08, H01R12/12			
Applicant 3M INNOVATIVE PROPERTIES COMPANY et al.			

- This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 8 sheets, including this cover sheet.
- This report is also accompanied by ANNEXES, comprising:
 - ☒ sent to the applicant and to the International Bureau a total of 3 sheets, as follows:
 - ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

- This report contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand 13.08.2005	Date of completion of this report 28.09.2005
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Criqui, J-J Telephone No. +31 70 340-3358 

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ON PATENTABILITYInternational application No.
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Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-30

as originally filed

Claims, Numbers

1-9

received on 13.08.2005 with letter of 12.08.2005

Drawings, Sheets

1/14-14/14

as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**International application No.
PCT/US2004/031258**Box No. II Priority**

1. ☒ This report has been established as if no priority had been claimed due to the failure to furnish within the prescribed time limit the requested:
- ☒ copy of the earlier application whose priority has been claimed (Rule 66.7(a)).
 - ☐ translation of the earlier application whose priority has been claimed (Rule 66.7(b)).
2. ☐ This report has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rule 64.1). Thus for the purposes of this report, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-9
	No: Claims	
Inventive step (IS)	Yes: Claims	8, 9
	No: Claims	1-7
Industrial applicability (IA)	Yes: Claims	1-9
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement.

1 The following documents are referred to in this communication:

D1 : US-A1-2002/006744 (TASHIRO ISAO) 17 January 2002 (2002-01-17)
D2 : US 5 888 076 A (ITOH ET AL) 30 March 1999 (1999-03-30)
D3 : EP 1 100 166 A (HIROSE ELECTRIC CO., LTD) 16 May 2001 (2001-05-16)

2 INDEPENDENT CLAIM 1

2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject matter of claim 1 does not involve an inventive step in the sense of Article 33(3)PCT.

2.1.1 Document D1, which is considered to represent the most relevant state of the art to the subject matter of claim 1, discloses (the references in parentheses applying to this document):

- a connector (21) comprising**
 - a terminal element (23) including a conductor-connecting section (35, 36) connectable with a conductor of an electric wire (46) and a contact section (33) capable of coming into conductive contact with a corresponding terminal element of a counterpart connector;**
 - an electrically insulating body (22) for supporting said terminal element (23) while exposing said conductor-connecting section (35, 36) and said contact section (33); and**
 - an abutting member (40) assembled with said body (22) to bring the conductor of the wire into abutment with said conductor-connecting section (35, 36) of said terminal element (23) under pressure;**
 - wherein said body (22) includes a fitting portion (24) capable of fitting to the counterpart connector while positioning said contact section (33) of said terminal element (23) with respect to the corresponding terminal**

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element.

2.1.2 The subject-matter of independent claim 1 differs from the disclosure of D1 in that:

- a) **said conductor-connecting section protrudes from said body; and**
- b) **said conductor-connecting section and said contact section of said terminal element are arranged to be aligned with each other in a direction intersecting a connector fitting direction determined by said fitting portion.**

2.1.3 The problem to be solved by the present invention may therefore be regarded as **decreasing the external size of the connector along the fitting direction and the direction in which the wire extends.**

2.1.4 In view of D2 the solution proposed in claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons (the references in parentheses applying to this document):

- a) The feature "**conductor-connecting section (31d) protrudes from said body (11)**" has already been employed for the same purpose in a similar connector, (see D2, column 4, lines 50-59, figure 6). Furthermore it should be noted that the specific design (best seen in D2, figure 6) of insulator body (11) and contact element (13), namely the combination of the inclined surface (11g) faced to the spring portion (31a) and inclined from the first surface (11a) towards the second surface (11b), contributes to the solution of the problem mentioned in point 2.1.3 above.
- b) Feature "**contact elements holding portion (13a), terminal portion (13b) and terminal receiving hole (19)**" is described in D2 (see D2: column 4, lines 40-42; column 4, line 66 - column 5, line 2; column 7, lines 6-9; column 7, lines 60-62) as providing the same advantages as in the present application.

It would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these features with corresponding effect to a connector according to D1, thereby arriving at a connector according to claim 1.

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2.1.5 Therefore the features disclosed in D1 and D2 would be combined by the skilled person, without exercise of any inventive skills in order to solve the problem posed. The proposed solution in independent claim 1 thus cannot be considered as involving an inventive step (Article 33(3) PCT).

3 DEPENDENT CLAIMS 2-7

Dependent claims 2-7 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step (Article 33(3) PCT) either because these features are already disclosed (see therefor D1, D2) or because the skilled person would regard it as a normal design procedure to combine these features.

4 INDEPENDENT CLAIM 8

4.1 Document D3, which is considered to represent the most relevant state of the art to the subject matter of claim 8, discloses (the references in parentheses applying to this document):

a connector (20) comprising:

- **a plurality of terminal elements (22) respectively including lead sections (22C) connectable with a circuit board and contact sections (22B) capable of coming into conductive contact with corresponding terminal elements (12) of a counterpart connector (10); and**
- **an electrically insulating body (21) for supporting said plurality of terminal elements (12) while exposing said lead sections (22C) and said contact sections (22B);**
- **wherein said body 21 includes a fitting portion capable of fitting to the counterpart connector (see D3, § [0013], figure 2) while positioning said contact sections (22B) of said terminal elements (22) with respect to the corresponding terminal elements (12);**

From this, the subject-matter of independent claim 8 differs in that:

- **each of said contact sections of said plurality of terminal elements**

includes a first contact point fixedly arranged on said fitting portion and a second contact spaced to be oppositely facing said first contact point in an elastically displaceable manner; and
- wherein said plurality of terminal elements are disposed on said fitting portion in a parallel arrangement with said contact sections being alternatively reversed, in such a manner that, among two terminal elements arranged side-by-side, said first contact point of one terminal element is aligned with said second contact point of the other terminal element.

4.2 The subject-matter of claim 8 is therefore novel (Article 33(2) PCT).
The problem to be solved by the present invention may be regarded as:
realising a stably maintained connection with the counterpart connector and exercising a totally balanced resilient restoring force onto the terminal elements.

4.3 The solution to this problem proposed in claim 8 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

The prior art known from the documents in the search report, taken individually or in combination, neither discloses nor hints at the claimed solution.

5 DEPENDENT CLAIM 9

5.1 Dependent claim 9 does not contain any features which, in combination with the features of claims 1-7 to which it refers, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT) either because these features are already disclosed (see therefor D1, D2) or because the skilled person would regard it as a normal design procedure to combine these features.

5.2 Furthermore claim 9 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claim attempt to

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define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result.

6 INDUSTRIAL APPLICABILITY

The subject-matter of the present application, relating to a connector, fulfills obviously the criteria of industrial applicability (Article 33(4) PCT).

CLAIMS

1. A connector comprising:
 - a terminal element including a conductor-connecting section connectable with a conductor of an electric wire and a contact section capable of coming into conductive contact with a corresponding terminal element of a counterpart connector;
 - an electrically insulating body for supporting said terminal element while exposing said conductor-connecting section and said contact section wherein said conductor-connecting section protrudes from said body; and
 - an abutting member assembled with said body to bring the conductor of the wire into abutment with said conductor-connecting section of said terminal element under pressure;
 - wherein said body includes a fitting portion capable of fitting to the counterpart connector while positioning said contact section of said terminal element with respect to the corresponding terminal element; and
 - wherein said conductor-connecting section and said contact section of said terminal element are arranged to be aligned with each other in a direction intersecting a connector fitting direction determined by said fitting portion.
2. A connector according to claim 1, wherein said body includes a wire-holding section for locating the wire on a backside of said fitting portion as seen in said connector fitting direction, and wherein said connector fitting direction intersects an extending direction of the wire on said body, said extending direction defined by said wire-holding portion.
3. A connector according to claim 1 or 2, wherein said body includes a first support member having said fitting portion and supporting said terminal element, and a second support member having a bearing surface facing said conductor-connecting section of said terminal element supported on

said first support member and supporting the wire while positioning the conductor on said bearing surface; said first support member and said second support member being combined together in such a manner as to dispose said conductor between said conductor-connecting section and said bearing surface.

4. A connector according to claim 3, wherein said abutting member includes a pressing surface acting to press said conductor-connecting section of said terminal element supported on said first support member toward said bearing surface of said second support member, when said abutting member is assembled with said body.
5. A connector according to claim 3 or 4, further comprising a first shield member incorporated in said second support member and a second shield member incorporated in said abutting member in such a manner as to come into conductive contact with said first shield member; said first and second shield members being arranged at a position substantially surrounding said conductor-connecting section of said terminal element and the conductor of the wire in a non-contacting manner.
6. A connector according to claim 5, wherein the wire is a coaxial cable, and wherein said first and second shield members are capable of being electrically connected to a shielding of the coaxial cable supported on said second support member.
7. A connector according to any one of claims 1 to 6, wherein said contact section of said terminal element has a curved shape capable of conductively contacting with the corresponding terminal element of the counterpart connector at a plurality of points simultaneously, and wherein said fitting portion of said body includes a protruding support surface along which said contact section of said terminal element is securely supported.

8. A connector comprising:
- a plurality of terminal elements respectively including lead sections connectable with a circuit board and contact sections capable of coming into conductive contact with corresponding terminal elements of a counterpart connector; and
 - an electrically insulating body for supporting said plurality of terminal elements while exposing said lead sections and said contact sections;
 - wherein said body includes a fitting portion capable of fitting to the counterpart connector while positioning said contact sections of said terminal elements with respect to the corresponding terminal elements;
 - wherein each of said contact sections of said plurality of terminal elements includes a first contact point fixedly arranged on said fitting portion and a second contact point spaced to be oppositely facing said first contact point in an elastically displaceable manner; and
 - wherein said plurality of terminal elements are disposed on said fitting portion in a parallel arrangement with said contact sections being alternately reversed, in such a manner that, among two terminal elements arranged side-by-side, said first contact point of one terminal element is aligned with said second contact point of the other terminal element.
9. A connector system comprising a connector according to any one of claims 1 to 7 and a connector according to claim 8, in a manner that they can be connected to each other.